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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/510,416	10/06/2004	Kazuo Tsutsumi	19036/40136	8520

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EXAMINER	
LEE, CYNTHIA K	

ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 03/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/510,416	TSUTSUMI ET AL.	
	Examiner	Art Unit	
	Cynthia Lee	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-13 and 15-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-13 and 15-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/24/2006 has been entered.

Response to Amendment

This Office Action is responsive to the RCE request filed on 1/24/2006. Claims 1, 2, 4-13, and 15-19 are pending. Claims 1, 12, and 13 have been amended. Applicant's arguments have been considered, but are not persuasive. Thus, claims 1, 2, 4-13, and 15-19 are rejected for reasons of record.

Claims Analysis

The limitation "adapted to" has been considered but was not given patenetable weight because it has been held that the recitation that an element is "adapted to" perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison*, 69 USPQ 138.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 2, 4-13, and 15-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 recites the limitation "active material particles which include a high electron material" two times. Since claims 1, 12, and 13 contain earlier recitation thereof, it would be unclear whether if it refers to first and second active materials or only one active material. The applicant is advised to employ the language a "first" and second active material particles and "first" and "second" high electron-conductive material to better reflect the intended scope of the claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 4-12 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsutsumi et. al (WO00/59062) in view of Dansui (US 6033805) and further in view of Ikoma (US 5700596). Tsutsumi et. al. (US 6,689,507 B1) is used as an English translation of Tsutsumi et. al. (WO00/59062). Therefore, all claim numbers referred to Tsutsumi et. al. (WO00/59062) in this office action are found in Tsutsumi et. al. (US 6689507 B1).

With respect to claim 1, Tsutsumi (US 6689507 B1) discloses a battery comprising two vessels connected to each other with a member interposed

therebetween (col. 52, lines 51-53) and filled with electrolytic solutions (col. 52 line 55), the member being configured to permit passage of an ion (col. 52 line 52), active material particles (col. 52 line 53) which include a high electron-conductive material and/or have a coating of a high electron-conductive material on the surface, filled in the electrolytic solution within one of the vessels and adapted to discharge the electrons (col. 52 lines 54-55), filled in the electrolytic solution within the other vessel and adapted to absorb the electrons (col. 52 line 56-57), wherein electrically conductive current collectors are provided in contact with the active material particles within the two vessels (col. 52, lines 58-59).

Tsutsumi further discloses that the active material particles are in contact with adjacent active material particles such that electrons move to the current collector even when the electrons discharged within the active material particles are distant from the current collector (20:1-15).

With respect to claim 4, Tsutsumi discloses a battery wherein the current collectors in contact with the active material particles have a shape of any one of a rod, a plate, and a pipe (col. 53 lines 1-3).

With respect to claim 5, Tsutsumi discloses a battery wherein a heat transfer surface is installed within the vessels to keep a reaction temperature within the battery constant (col. 53 lines 10-12).

With respect to claim 6, Tsutsumi discloses a battery wherein the heat transfer surface is either a pipe-shaped current collector or a plate-shaped current collector which is in contact with the active material particles (col. 53 lines 13-15).

With respect to claim 7, Tsutsumi discloses a battery wherein a discharge means for discharging the degraded active material particles from the vessel and a feed means for feeding the active material particles to the vessel are respectively connected to the vessels (col. 53 lines 17-20).

With respect to claim 8, Tsutsumi discloses a battery wherein at least one of a recovery means for recovering the discharged active material particles and a makeup means for making up the active material particles is connected to the discharge means to allow recovered or newly replaced active material particles to be fed from the feed means to inside of the vessels (col. 53 lines 21-26).

With respect to claim 9, Tsutsumi discloses a battery wherein a reaction means that converts the discharged active material particles into charged active material particles through a thermal chemical reaction or an electrochemical reaction is connected to the discharge means to allow the charged active material particles to be fed from the feed means to inside of the vessels (col. 53 lines 27-31).

With respect to claim 10, Tsutsumi discloses a battery wherein active material particles on an anode side are hydrogen-occluding alloy particles and active material particles on a cathode side are nickel hydroxide particles (col. 53 lines 32-35). Further, a gas injected to the anode side is hydrogen and a gas injected to the cathode side is oxygen or air (col. 53, lines 35-43).

With respect to claim 11, Tsutsumi discloses a battery wherein active material particles on an anode side are hydrogen-occluding alloy particles (col. 53 lines 37-38), a gas injected to the anode side is hydrogen (col. 53 line 39), active material particles on

a cathode side are nickel hydroxide particles (col. 53 lines 40-41), and a gas injected to the cathode side is oxygen or air (col. 53 lines 41-43).

With respect to claim 12, Tsutsumi discloses a battery as set forth above in claim 1. Further, Tsutsumi discloses a layered three-dimensional battery comprising plural sets of unit batteries (col. 53 lines 44-46) and current collecting members configured to serve as separating walls that define the cells (col. 53 lines 53-56), the unit batteries being connected in series to one another with each of the electrically conductive current collecting members interposed between the unit batteries (col. 53 lines 53-55), and current collectors provided on the cells at both ends of the unit batteries in contact with the active material particles so as to serve as a cathode electrode and an anode electrode, respectively (col. 53 lines 56-59).

With respect to claim 15, Tsutsumi discloses a battery wherein an electrically conductive stud is provided integrally and protrusively from the current collecting member or the current collector toward an inside of the cell (col. 53 lines 60-62).

With respect to claim 1 and 12, Tsutsumi does not disclose a battery with active particles with include a high electron-conductive material and/or having a coating of a high electron-conductive material on the surface. Furthermore, Tsutsumi does not disclose a battery in which the active material particles form a fixed layer within the vessels.

Dansui discloses a nickel-hydrogen battery with an added thin film of nickel hydroxide solution powder formed on the surface of the nickel foil (col. 11, line 67) to enhance capacity density (abstract line 4).

Ikoma discloses a nickel-hydrogen battery with electrode particles shaped to enhance packing and energy density and cycle life (abstract lines 1-5). It inherently forms fixed layers of active material particles.

The inventive concept of designing a battery by forming an active material particle with high electron-conductive material or coating it with high electron-conductive material on the surface is obvious in view of Dansui.

The motivation for doing so would be to enhance the capacity density of an electrode, as taught by Dansui (abstract lines 2-4).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to combine Tsutsumi with Dansui for the benefit of designing active material particles with high electron-conductive material for enhanced capacity density. The thin film enhances conductivity of the electrode, thereby enhancing the capacity of the battery. Therefore, the thin film of nickel hydroxide meets the claim limitation of "high electron-conductive material."

The inventive concept of forming active material particles in a fixed layer is known in the art, as taught by Ikoma.

The motivation for doing so would have been for the benefit of enhanced packing and energy density, and cycle life, as taught by Ikoma (abstract lines 3-5).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to combine Tsutsumi and Dansui with Ikoma for the benefit of designing active material particles with high election-conductive material to form a fixed layer.

Claims 2, 13, 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsutsumi et. al (WO00/59062) in view of Dansui (US 6033805) and Ikoma (US 5700596) as applied to claim 1 above, and further in view of Katsumoto (US US 6114063).

With respect to claim 2, Tsutsumi, Dansui, and Ikoma disclose the battery of claim 1 as set forth above, incorporated herein.

With respect to claim 13, Tsutsumi, Dansui, and Ikoma disclose a layered three-dimensional battery as referred to in claim 12 above, incorporated herein. Tsutsumi further discloses that the active material particles are in contact with adjacent active material particles such that electrons move to the current collector even when the electrons discharged within the active material particles are distant from the current collector (20:1-15).

With respect to claim 16, Tsutsumi discloses heat transmitters within the two vessels to keep reaction temperature in the battery constant (col. 53, lines 10-12).

With respect to claim 17, Tsutsumi discloses means for discharging degraded powdered active materials out of the two vessels and means for supplying the powdered active materials into the vessels are connected to the vessels (col. 53, lines 17-20).

With respect to claims 18 and 19, Tsutsumi discloses a battery wherein active material particles on an anode side are hydrogen-occluding alloy particles and active

material particles on a cathode side are nickel hydroxide particles (col. 53 lines 32-35). Further, a gas injected to the anode side is hydrogen and a gas injected to the cathode side is oxygen or air (col. 53, lines 35-43).

Tsutsumi, Dansui, and Ikoma do not disclose a battery with a porous active material in claims 2 and 13.

Katsumoto discloses a nickel battery with a porous active material (abstract lines 1-3).

The inventive concept of forming active materials particles comprising a porous body is known in prior art, as taught by Katsumoto.

The motivation for doing so would be to increase conductivity of the active materials (col.1 lines 33-34).

Therefore, it would have been obvious to a person of ordinary skill in the art to combine Tsutsumi, Dansui, and Ikoma with Katsumoto's for the benefit of designing a battery with active material particles that are porous to increase the conductivity thereof.

Response to Arguments

Applicant's arguments filed 10/13/2005 have been fully considered but they are not persuasive.

Tsutsumi does disclose that the active material particles are in contact with adjacent active material particles such that electrons move to the current collector even when the electrons discharged within the active material particles are distant from the current collector (20:1-15), despite applicant's assertion that it does not.

Applicant argues that Tsutsumi's particles cannot form a fixed layer and that Tsutsumi's particles are suspended in liquid and are maintained dispersed in fluid.

This argument has been addressed in the previous Office Action and is reiterated for applicant's convenience. Applicant has not contemplated the possibility that such particles might precipitate together, one upon another, so as to form a thin film/layer on any surface of the vessels or even on the liquid material (electrolytic solution) molecules. Further definition of what is meant by a fixed layer in the claimed context of having the active material particles filled in the electrolytic solution and with in the vessel is required.

Applicant asserts that Dansui fails to disclose or suggest a battery by forming active material particles. It appears that the applicant has misunderstood the reliance of Dansui because Tsutsumi discloses of designing a battery by forming active material particles.

In response to applicant's argument that his/her invention has the following advantages: 1) the active material circulating device; 2) the recovery/replacement of the degraded active material; 3) scale enlargement and 4) energy density, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Lee whose telephone number is 571-272-8699. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ckl

Cynthia Lee

Patent Examiner

RAYMOND ALEJANDRO
PRIMARY EXAMINER